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SONNENSCHEIN NATH & ROSENTHAL LLP
P.O. BOX 061080
WACKER DRIVE STATION, WILLIS TOWER
CHICAGO, IL 60606-1080

EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/504,813	GOTO ET AL.	
	Examiner	Art Unit	
	Jonathan Crepeau	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7,10,13 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7,10,13 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action addresses claims 7, 10, 13, and 17 are addressed herein. The claims are rejected over the combination of Narang et al., Schneider et al., Gozdz et al., and Kumeuchi et al. (reliance on Takamiya et al. no longer being necessary due to Applicant's amendment). Accordingly, this action is made final.

Claim Suggestions

2. In claim 13, "said nonaqueous solvent" lacks proper antecedent basis and is interpreted as "said swelling solvent." Appropriate correction is suggested but not required.

Claim Rejections - 35 USC § 103

3. Claims 7, 10, 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narang et al (U.S. Patent 6,168,885) in view of Schneider et al (U.S. Patent 6,180,281) in view of Gozdz et al (U.S. Patent 5,840,087) in view of Kumeuchi et al (U.S. Patent 6,156,080).

Regarding claims 7 and 17, In Figure 1 and in column 11, lines 4-12, Narang et al. generally teach a process for making a battery comprising the steps of coating a negative electrode with electrolyte (26), coating a positive electrode with electrolyte (36), and laminating the two electrode/electrolyte sheets together under heat (42) so as to form a single, continuous

electrolyte. The electrolyte layers contain a matrix polymer, plasticizer (solvent), and a lithium salt, and are gelled (see column 11, lines 7 and 8). The plasticizer may comprise ethylene carbonate (EC) and dimethylcarbonate (DMC) (see column 10, lines 34-55) and the salt may comprise $LiPF_6$, $LiBF_4$, and $LiAsF_6$, among others (see col. 10, line 23). The matrix polymer may comprise polyvinylidene fluoride (see col. 10, line 34).

Narang et al. do not expressly teach that the electrode/electrolyte sheets are wound, inserted, and sealed into a film pack prior to heat-treatment, or that the electrolyte layers are formed into a "seamless" layer, as recited in claims 7 and 17. The reference further does not expressly teach that both sides of each electrode are coated with electrolyte (claims 7 and 17), or the duration of the lamination (claim 10).

The patent of Schneider et al. is generally directed to composite separator and electrode structures comprising seamless interfaces between the separator and electrodes (see abstract).

It is submitted that the artisan would be motivated by the disclosure of Schneider et al. to form the electrolyte layers of Narang et al. into a "seamless" layer. In column 6, line 30 et seq., Schneider et al. teach that "the interfaces between the advancing polymer boundaries having merged to lose completely any independent identity. The resulting structure is very pliant, translucent, and smooth, but extraordinarily strong, as shown in the Examples." The reference further teaches in column 2, line 65 et seq. that "the resultant composite allows ions to freely migrate from the electrode domain through the separator domain during successive charging and discharging of the battery." Accordingly, these teachings of Schneider et al. would motivate the artisan to form a "seamless" interface between the electrolyte layers of Narang et al. In addition,

the patent of Gozdz et al. is taken as further evidence of electrolyte layers being laminated together to form a continuous seamless layer (see col. 6, line 43 of Gozdz).

The patent of Kumeuchi et al. is directed to methods of making electrode assemblies. In claim 47, the reference teaches a process comprising the steps of winding an electrode assembly, inserting the assembly into a bag (film pack), sealing the bag, and simultaneously heating and compressing the wound electrode assembly.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the process of Kumeuchi et al. to manufacture the battery of Narang et al., thereby resulting in the process of claims 7 and 17. In the abstract, Kumeuchi et al. teach the following:

> trode sheet deposition. In accordance with the above-mentioned method, it is possible to increase a cell capacity per a unit volume in a prismatic cell, because the electrode sheet can be wound further half turn or a plurality of times. In addition, it is also possible to increase an efficiency in a charging and discharging cycle, because a gap between the electrodes and the insulating sheet is made smaller, and a space in a center of the wound electrode sheet deposition is also made smaller, ensuring uniform reaction in the electrode.

Accordingly, the artisan would be motivated by this disclosure to wind and heat the electrode assembly of Narang et al. according the process of Kumeuchi, thereby rendering the claimed process steps obvious (i.e., winding, then inserting and sealing, then heat-treating). It is further noted that Kumeuchi et al. teach a heating time of 30 minutes or less in claim 34 of the reference. Such disclosure renders obvious the claimed time of 10 minutes.

Regarding the limitation in claims 7 and 17 that both sides of both electrodes are coated with electrolyte, the artisan would be sufficiently motivated to perform this step with the electrodes of Narang et al. Narang et al. teach at column 11, line 9 that "as many layers as necessary can be laminated together to provide the desired capacity of the final electrochemical cell." This disclosure clearly indicates that both sides of each electrode may be coated (to result in, for example, a stacked cell configuration). Furthermore, as noted above, the artisan would be sufficiently motivated to use a spirally-wound configuration with the electrodes of Narang et al. In order to achieve such a configuration, the artisan would understand that an electrically insulating material would have to present on both sides of each electrode in order to prevent a short circuit. In view of Narang's teaching of multi-layer cells above, the coating of electrically insulating, ion-conductive electrolyte material on both sides of each electrode would be an obvious way of eliminating such a short circuit. Accordingly, this limitation would also be rendered obvious to the skilled artisan.

Narang et al. further do not teach that the gelled electrolyte comprises polyhexafluoropropylene in addition to polyvinylidene fluoride, as recited in claims 7 and 17, and that such matrix polymer has an ion conductivity higher than 1 mS/cm at room temperatures.

The Gozdz et al. reference, in Example 1, teaches a copolymer of vinylidene fluoride and hexafluoropropylene to make the separator/electrolyte coating solution.

Therefore, it is submitted that the limitation in claims 7 and 17 that the matrix polymer comprises polyhexafluoropropylene and polyvinylidene fluoride would be rendered obvious by this disclosure. All the claimed elements were known in the prior art and one skilled in the art

could have combined the elements as claimed by known methods with no change in their respective functions and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. Accordingly, it would have been obvious to use the polyhexafluoropropylene and polyvinylidene fluoride matrix polymer of Gozdz et al. in the gel electrolyte of Narang et al. It is further noted that this composition is suitable for subsequent laminating and integrating, as required by Narang et al. In addition, regarding the limitation directed to ion conductivity, it is submitted that the matrix composition of Gozdz et al. would inherently have an ion conductivity higher than 1 mS/cm at room temperature.

Response to Arguments

4. Applicant's arguments filed December 1, 2009 have been fully considered but they are not persuasive. Applicants assert that "*Schneider* and *Kumeuchi* each fail to disclose anything pertaining to inserting or sealing an electrode into a film pack […] *Kumeuchi* discloses placing an unsealed wound electrode into a mold and compressing the wound electrode before heat treating the wound electrode and then sealing the would [sic] electrode with a laminating film. See, U.S. Pat. No. 6,156,080, Col 10, 1. 33-53." With respect the Kumeuchi reference, contrary to the above assertions, the reference expressly teaches at column 10, line 11 that the wound electrode unit is sealed inside the soft plastic bag "14" prior to being heat-treated. Further, claim 47, section (d) of Kumeuchi discloses the same sealing step. As the disclosed bag corresponds to the claimed "film pack," the position is maintained the combination of references, in particular

Narang as modified by Kumeuchi, teach and/or render obvious all of the claimed method steps as well as the order of such method steps. Accordingly, the rejection as stated above is believed to be proper.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley, can be reached at (571) 272-1453. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795
March 10, 2010